

## Article

# Strategic Guidelines for the Intellectualization of Human Capital in the Context of Innovative Transformation

Aleksandra Kuzior <sup>1,\*</sup> , Olena Arefieva <sup>2</sup>, Alona Kovalchuk <sup>2</sup>, Paulina Brożek <sup>3</sup> and Volodymyr Tytykalo <sup>4</sup>

<sup>1</sup> Faculty of Organization and Management, Silesian University of Technology, 26 Roosevelt Str., 41-800 Zabrze, Poland

<sup>2</sup> Faculty of Economics and Business Administration, National Aviation University, 1, Liubomyra Huzara Ave., 030580 Kyiv, Ukraine

<sup>3</sup> JSofteris, 41-219 Sosnowiec, Poland

<sup>4</sup> Bogomolets National Medical University, 13 Taras Shevchenko Boulevard, 01601 Kyiv, Ukraine

\* Correspondence: [aleksandra.kuzior@polsl.pl](mailto:aleksandra.kuzior@polsl.pl)

**Abstract:** Context and purpose: This study focuses on identifying the current qualities of enhancing the action of intellectualization of human capital. The main purpose of the article is to identify relevant strategic benchmarks for the intellectualization of human capital in enterprises under conditions of innovative transformation. Research method: The methods of research are synthesis and analysis, used to identify trends in the processes of intellectualization of human capital on enterprises, factor analysis methods in combination with methods of expert evaluations, and other general scientific methods. Findings: The article offers, for the first time, a definition of the essence of intellectualization of human capital as a separate economic process, which is based on the renewal of competencies in accordance with the needs of enterprise development and includes the need for their up-to-date globalization and industry trends in the economy of the country. The relationship between the intellectualization of human capital and innovation has been defined. The influence of factors on the processes of intellectualization of human capital on enterprises in conditions of innovative transformations has been investigated. It was found that such factors are prerequisites for the formation of strategic guidelines for the development of the intellectualization of human capital. The main aspects of innovative transformations by identifying trends of intellectualization of Ukrainian human capital in the international space through the analysis of the Global Innovation Index have been investigated. Conclusion and innovation: Thus, the relationship between the intellectualization of human capital and innovation, which affects the sustainability of economic systems, was determined. According to the results of the study, the key directions of formation and development of strategic guidelines for the intellectualization of human capital of enterprises are proposed.

**Keywords:** innovations; strategic guidelines; intellectualization; human capital; development; innovative transformations



**Citation:** Kuzior, A.; Arefieva, O.; Kovalchuk, A.; Brożek, P.; Tytykalo, V. Strategic Guidelines for the Intellectualization of Human Capital in the Context of Innovative Transformation. *Sustainability* **2022**, *14*, 11937. <https://doi.org/10.3390/su141911937>

Academic Editors: Andreia Gabriela Andrei and Stefan Andrei Nestian

Received: 20 August 2022

Accepted: 15 September 2022

Published: 22 September 2022

**Publisher's Note:** MDPI stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



**Copyright:** © 2022 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

## 1. Introduction

The continuity of economic development is a consequence of ongoing research in the field of economics. Today, such research demonstrates the defining role of the human being as a source of development in the economic environment. Human capital is therefore the subject of scientific debate in various aspects, especially in the context of the combination of development, innovation, and human capital. In today's world, innovation is both a product of intellectualization and a catalyst for human capital development, which leads to the formation of strategic guidelines. The intensification of innovation transformation entails dynamic movement of economic systems and processes of their adaptive management. The dynamic development of economic systems entails the intensification of the attraction of innovation in various spheres of activity. At the same time, the innovative

direction of the development of economic systems at different levels is a consequence of the intellectualization of human capital. In general, it is appropriate to note that there is a circular relationship between the development of human capital, innovative transformations, and strengthening of intellectualization processes. Innovations are the product of processes of intellectualization of human capital, which entails further development of economic systems and induces personnel to continuous learning, which becomes strategic in nature, etc.

The development of human capital is a subject of research of many scientists, in particular [1–10]. The works of scientists that allow us to identify the main theoretical directions of human capital research are considered. Modern developments indicate trends in human capital research concerning digitalization [11], state influence on human capital development [12], evaluation of human capital efficiency within an enterprise [6] and the state [13], and innovative development of individual components of human capital [14].

At the same time, the relationship between the development of innovation and human capital is not sufficiently disclosed in the reviewed works due to the impact of various factors. In this article, we propose to learn the trends of interrelation of innovation development (through the Global Innovation Index) and human capital, consider the issues of intellectualization of human capital as a modern integration process including at the level of enterprises, and identify the impact of individual groups of factors on intellectualization of human capital in conditions of innovative transformations.

To clarify this issue, the authors used general scientific methods of knowledge, which are based on the empirical experience of preliminary research in the field of economic processes. To identify trends in the intellectualization of Ukrainian human capital in the international space through the indicators of the Global Innovation Index, the authors use methods of analysis, comparisons of statistical information, and trends in this indicator at the international level and with regard to Ukraine. For revealing the influence of factors on processes of intellectualization of enterprises' human capital under the conditions of innovative transformation, the authors use methods of factor analysis in combination with methods of expert estimations, which allows for the allocation of factors in two groups: sociopolitical and economic/financial. Thus, this article will improve scholars' understanding of the impact of international innovation space and domestic socio-political and economic/financial factors on the development of the intellectualization of human capital of an enterprise. The use of innovation and intellectualization of human capital allows us to attract large amounts of limited resources for the development of economic systems, in order to use new methods of economic, social, resource, and labor management potential with regard to economic entities at the strategic level. The study of strategic aspects of enhancing the intellectualization of human capital requires the identification of factors that can influence it. Moreover, consideration of the intellectualization of human capital should be made with the account of innovative transformations, because these concepts are interconnected with each other.

The article is structured into eight sections, which fully allow the research to be carried out. These sections are: 1. Introduction, 2. The theoretical basis of scientific research, 3. A description of existing actions and their biases in practice, 4. Discussion, 5. Reference to the main material, 6. Materials and methods, 7. Results, and 8. Conclusions. This structure of the article allows us to identify the main trends of intellectualization of human capital, proposing the directions of strategic guidelines for the development of intellectualization of human capital and forming the basis for further research on human capital under conditions of innovative transformations.

## 2. The Theoretical Basis of Scientific Research

Theoretical studies of the essence of the category "human capital" were conducted by Goldin [15], Deming [16], Becker [1], and Prukinska, et al. [17]. The author Claudia Goldin states that "Human capital is the stock of productive skills, talents, health and expertise of the labor force, just as physical capital is the stock of plants, equipment, machines

and tools" [15]. That is, the author compares human capital with production factors and emphasizes that human capital, like physical capital, has certain characteristics: "productivity, vintage and efficiency", which may differ. However, we believe that the author has not sufficiently described the properties of human capital as an economic category. The author also notes that human capital is a product of "investment decisions" [15], but notes that the development of human capital involves not only a reliance on investment, but also its implementation. From a theoretical point of view, the category "human capital" was investigated by David J. Deming: "human capital theory is the widely accepted idea that education, training and other forms of learning are investments that pay off in the future" [16]. However, we do not agree with the author about the thesis that "education, training and other forms of learning" are the only elements of human capital; we believe that such a statement [16] does not fully reflect the individual essence of the category. G.S. Becker viewed human capital as "the expenditure on education, training, health care, etc." that allows a person to develop "his or her knowledge, skills, health or values" [1]. Ukrainian scientists E.V. Prukinska, et al. [17] noted that "human capital is a set of inherent knowledge, skills, abilities, and qualifications of labor force carriers that can be used by each person for production or consumption purposes". Again, as with previous authors [1,16] Prukinska, et al. [17] highlight "knowledge, skills and abilities" without taking into account individual learning and innovation capabilities, and the role of human capital in the enterprise.

In terms of determining the factors influencing the formation of strategic guidelines and human capital, which are the subject of our article, the research was carried out by Kharazishvili et al. [18], Kuzior [19], Arefieva et al. [20], Sardak et al. [21], and others [2,11,22–28]. Y. Kharazishvili, et al. [18] considered the integration of the main factors of human capital development: research, education, and innovation in the European environment from a strategic point of view. This approach shows the complexity of human capital development, as well as its global integration in the direction of achieving sustainable development [19]. In the context of our study, the experience of the influence of human capital development factors (research, education, and innovation) [18,19] at the strategic level can be used to identify the impact on economic stability. O. Arefieva, et al. [20] examine the impact of sustainable development on the reproduction of human capital through its reflection in the system of organizational behavior at the enterprise. The authors [20] describe the application of a systemic approach in the management of sustainable development through the reproduction of human capital. We believe that this approach [20] has a strategic nature and reflects the intellectualization of human capital through the prism of the development of organizational culture of the company. However, the authors [20] do not take into account the impact of innovative transformations on the reproduction of human capital of the enterprise, which indicates a lack of development of the theory of human capital intellectualization and allows us to propose our own hypothesis on this issue. S. Sardak, et al. [21] investigated the factors of social development and global risks. We believe that because of the impact on the security and well-being of the population, such factors affect the ability of individuals to develop intellectual abilities, which are the main source of intellectual capital and influence sustainable development. Such an approach requires special attention in conditions of active innovative transformations [2,11,22–28]. The authors analyze the global challenges that condition global transformations from the perspective of strategic orientation; that is, it is expedient to take into account the reasons of public development when singling out relevant strategic approaches to the intellectualization of human capital. However, the studies [2,11,18–28] do not take into consideration the global economic environment, which is a sufficiently important factor in the development of human capital in modern conditions.

Through the prism of intellectualization and the processes springing up on it (e.g., digitalization), studies of human capital have been carried out by Kuzior et al [3], Tulchynska et al. [12], Chapman and Pope [29], Tanzharikova [30], and others [31,32]. A. Kuzior, et al. [3] investigate the impact of digitalization on the formation of personnel competencies, i.e., providing

the labor potential of enterprises in variable unpredictable processes. In [3], it is considered that one of the directions of human capital development in conditions of innovative transformations is digitalization, through which the personnel and the enterprise acquire “an increase in organizational resilience”. S. Tulchynska, et al. [12] also note the importance of digitalization processes in providing modernization of microeconomic systems, constituting the resource provision of innovation and investment. In [12], they again traced the relationship of capital, resources, and innovation. However, these studies [12] do not take into account the strategic development of the digitalization aspects of human capital, which affect the achievement of economic stability of economic structures. Training and education are no less important components of the intellectualization of human capital. Bruce J. Chapman and David Pope found the dependence of public policy, higher education, and human capital formation [29]. The role of education in the formation of human capital and its intellectualization was considered by A. Tanharikova [30]. The influence of these components on the development of human capital in their studies was discussed by S. Dovgyi, et al. [31]. The authors of [30,31] emphasized that it is the educational component that can become a strategic direction of human capital development in the era of technological change. However, it [30,31] should be noted that this approach is rather limited in the context of the search for strategic guidelines for the intellectualisation of human capital, as it requires taking into account the interdependence of the development of scientific and technological progress, education, science, and human capital. Y. Pylypenko et al. [32] found that the development of human capital and its qualitative parameters (including intellectualization) depend on the achieved level of social well-being in a particular country. The authors [32] noted that gaps in the development of human capital, and its investment perceive the imbalance of technical and technological development on a global level. That is [32], the intellectualization of human capital is a global problem of economic, financial, and innovative nature, and its solution requires strategic properties.

The work of academics in the innovative change environment is presented in Vătămănescu et al. [33], Di Fabio and Peiró [34], Iarmosh [35], and Kuznetsova [36]. The article [33] investigated the relationship between intellectual capital, sustainable competitive advantages, and the processes of internationalization of small and medium enterprises. The authors [24] noted the outstanding role of managerial abilities in internationalization processes through the use of human capital. The intellectualization of human capital is primarily motivated by the well-being of employees, which requires the use of management tools; one of the tools of human capital management is leadership [34]. This viewpoint is held by A. Di Fabio and J.M. Peiró, who developed an integrated leadership construct in the sustainable development of human capital [34]. The modern stage of economic relations shows the interdependence of sustainable development and the intellectualization of human capital, especially when the pace of innovative transformations increases. O. Iarmosh, et al. explore the “innovativeness of creative economy as an important driver of sustainable development of the world economy” [35]. Thus, the authors [26,35] connect human capital (which frequently refers to creative thinking and creative potential), innovation, and sustainable development. Moreover, research on the development of human capital in the creative economy was conducted by Kuznetsova, et al. They confirm the relationship of investment in human capital to the development of the creative class and the creative economy and, as a result, economic progress is taking place [36].

There is a fair amount of research on the relationship between sustainable development and the intellectualization of human capital, including in the strategic dimension, in modern scientific theory [20,34,37–41] and other areas. The dynamism of innovative transformation in various industries and their impact on the intellectualization of human capital was investigated by Poberezhna [4], Maslak, et al. [42], Lepeyko and Chernovanova [43], Lenihan, et al. [44], Cammeraat, et al. [13], and others. From the perspective of the internal environment and improvement of the system of interrelationships in conditions of limited resources, the impact of human capital on the development of the enterprise was studied by Marimuthu, et al. [5]. Its impact on enterprise perfor-

mance was studied. J. M. Pennings, et al. [6] studied the role of human capital in firm-liquidation processes. G. Wei et al. [7] studied the risk assessment of enterprise human capital investment. At the national level, research on human capital through the prism of competitiveness assessment was investigated by Vo and Tran [8], Klimontowicz and Majewska [45] and Puzynya, et al. [46]. The modern methodology for assessing the effectiveness of human capital in an enterprise from different perspectives has been considered by Pirogova, et al. [47], Ahmad, et al. [48], and Dzenopoljac, et al. [49]. However, the reviewed studies [4–8,13,32–35,37–49] on evaluating the effectiveness of human capital took into account only certain components of the subject of our study and used the authors' methods. Taking into account the preliminary research on the evaluation of human capital efficiency, we use the methods of expert evaluations and factor analysis, the combination of which will allow us to take into account the current aspects of forming strategic guidelines for human capital development.

### 3. Description of Existing Achievements and Their Implications for Practice

The theoretical framework of the study shows a rather active position of scientists on human capital development, which intensifies with the dynamic development of innovation and technology in the world. Modern scientists pay attention to the fact that human capital and innovation is a reciprocal process, which is a factor in the level of economic development of the economy at the:

- macro-level: the level of economic growth of the state, the ability of transnational corporations to spread, the intensification of globalisation;
- regional levels: the development of particular territories and regions depends on the level of human capital performance and innovation (e.g., Silicon Valley);
- micro-level: enterprises which actively develop their own intellectual human capital are industry leaders, have a high level of personnel and production competitiveness, have a number of specific advantages in any type of market, and have a high level of corporate culture; and
- individual level: each bearer of intellectual human capital seeks to develop, directly participate in the intellectualisation of human capital; personnel who are bearers of human capital at the enterprise level provide the basic efficiency and development of innovation at the higher levels of the economic environment.

Thus, the researchers conducted a thorough analysis of the need for continuous improvement and digitalization of the competence of the staff. This contributes to the formation of intellectual capital for reproduction on a non-technological basis and takes into account the achievements of sustainable development. The scientists have also developed human capital from the point of view of intellectual abilities, ensuring labor potential, opportunities for implementing organizational behavior, and ensuring sustainability of enterprise activity. From the macroeconomic standpoint, human capital has been considered through the prism of resources and innovation in the context of globalization transformations and features of the European space.

Consequently, in practice, the intensification of research on human capital development and innovation allows analysis of current trends in this direction, forecasting the processes of human capital intellectualization of individual regions, countries or enterprises, and identification of key factors of human capital intellectualization. At the level of companies, such research allows for the introduction of innovative ways of managing human capital in order to ensure development from a strategic perspective. The intellectualization of human capital from the standpoint of competitiveness and the formation of strategic guidelines on an innovative basis needs further elaboration and justification. Therefore, it underlines the mainstreaming of the topic for the development of economic relations and the possibility of its adaptation to innovative transformations.

#### 4. Discussion

The appropriateness of using the concept of human capital intellectualization at different levels is substantiated by the already available research of scientists considering different aspects of human capital development: innovation [23,28], digitalization [11,12], education [6,13], integration [7,18], sustainability [19,35] at the macro-level [36,43,50], regional level [40,51], and micro-level (enterprise or individual) [10,18,37,43], etc.

The reviewed scientific works, on the basis of which this study was conducted, allow us to form a hypothesis concerning the definition of the concept of “intellectualization of human capital”, which is presented below. We believe that the application of the proposed definition is appropriate for implementation, depending on the level of the economy, enterprise, industry, division, or activity. This will contribute to a clearer justification of personnel functions when realizing the benefits and requirements of intellectualization.

The development of this scientific direction will be facilitated by the introduction of an innovative approach to the transformation of human capital and its intellectualization of adaptive management structures, respectively. The requirement of modern market processes is to optimize the timing of business processes over time, as well as to rationalize the cost of resources, which will contribute to the sustainability of the enterprise. Subsequent research will focus on identifying the effects of human capital intellectualization on the sustainability of economic systems.

#### 5. Synopsis of the Main Material

Modern economic conditions require the constant implementation of changes in the external and internal environment of the enterprise, and the formation of prospective directions of activity to ensure strategic positions. The implementation of this process should take place on an innovative basis in the context of human capital development. The innovativeness of economic development at all levels of management implies structural changes based on the use of new knowledge, reflected by technologies and the content of human capital. One of the components of enterprise development is the enhancement of human potential in the strategic dimension through the tools of intellectualization.

Human capital is a dynamic concept, the development of which requires motivation to reproduce and intellectualize [20]. Development and preservation of human capital in the creative economy is based on investment in education and health, mobility, and access to information [36]. At the macro-level, human capital is a more valuable resource of modern society. At the micro-level, the structure of human capital needs to highlight the knowledge and abilities of the person, experience, skills of the worker, and the motivation of the work of information [51]. Thus, the intellectualization of human capital is a complex, multidimensional process of development of an individual’s intelligence, based on the application of skills, abilities, competencies, digital technologies, information, creative thinking to achieve well-being, and sustainable development on a strategic global level. Intellectualization of human capital on enterprises in the context of increasing innovative transformations is a necessary process that affects various areas of economic life of society in the strategic dimension.

The implementation of the intellectualization of human capital occurs on an ongoing basis, as it is due to the introduction of innovation [22,23,44], scientific and technological development [10,13,40,52], and digitalization of economic [2,3] and social processes, modernization changes [12,37,51], adaptation of economic actors and other socioeconomic processes [11,25,35,53], which are variable in nature, and therefore have unique characteristics and requirements for human capital. Comprehensive change entails intensifying intellectualization. Such requirements impose on them the pace of scientific and technological development, requiring an appropriate level of knowledge updating and determination of the need for this knowledge in the production, social, and reproduction processes at the strategic level [18,53,54]. This is based on the formation of certain competencies, meaningfully reflecting the functions of human capital for the implementation of achievements

at the enterprise. The formation of such competencies can be regulated through strategic guidelines for the intellectualization of human capital, in particular for enterprises.

A significant role in the intellectualization of human capital is played by state regulation, which creates a political and legal basis for the activation and actualization of human capital [6,51]. At the same time, the potential and possibilities of human capital are necessarily used in the processes of socioeconomic development of the state. State regulation of intellectualization allows one to activate human capital in various sectors of the economy, satisfying certain needs of goods and services of appropriate quality.

No less an important direction of development of the processes of intellectualization of human capital on enterprises are the motivational aspects, which will manifest themselves on the macro-, micro-, and meso-levels of socioeconomic life [12,20]. As human capital implies the increase of abilities, competencies, and knowledge, it is the bearer of this capital that is the most motivated in providing intellectualization [31]. For an individual, intellectualization can be a consequence of satisfying personal interests and needs for development, enriched or security. Motivations of the processes of intellectualization of human capital on enterprises at the meso- and macro-levels of the economy are capacity building, provision of intellectual security [37], satisfaction of social needs, development, and individual regions. At the same time, motivational aspects of the intellectualization of human capital have a reciprocal relationship, because the desire to achieve sustainable economic growth induces bearers of human capital to intensify the building of their own potential. Let us note that all these processes are nothing but factors in the formation of strategic guidelines for the intellectualization of human capital on enterprises.

In the realities of the modern stage of economic relations, two of the determining areas are financial and social relations. Any economic or social processes must be financially supported. That is, the availability of financial resources today is a key factor in socioeconomic development. At the same time, at the level of the individual, in most cases the improvement of financial situation is a determining economic interest, which leads to the development of intelligence. The relationship between the financial development and human capital has a significant impact on the economic growth, especially in the context of developing countries [53]. The processes of intellectualization of human capital must be financially secured, especially in the context of innovative transformations. Accordingly, human capital has its own value [54], the increase of which affects the growth of the value of the firm, cluster, or industry.

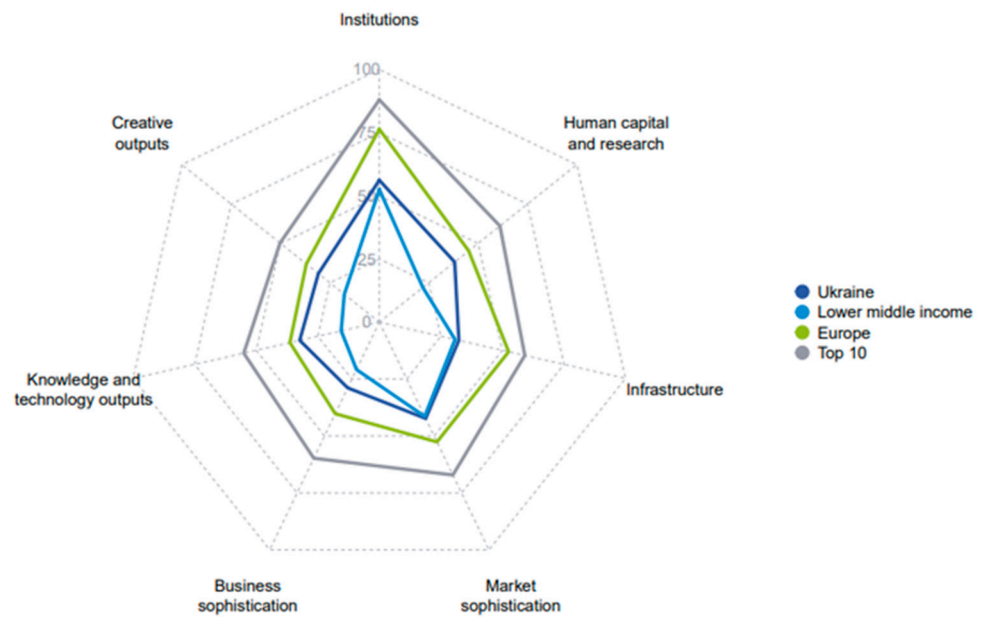
#### *Exploring Ukraine's Human Capital in the International Space*

Thus, the factors of formation of strategic directions of intellectualization of human capital cover different spheres of activity of the subjects of economy. We consider it expedient to group them into two subgroups: sociopolitical and economic/financial. At the same time, we note that the strategic dimension of the intellectualization of human capital requires taking into account the global international space, which affects the national level.

The openness of economic systems and their close interconnection in the analysis of innovation processes allows the use of data from international studies of the intellectualization of human capital in the context of innovation processes. One such study is the Global Innovation Index (GII), which consists of about 80 indicators reflecting innovation processes in the country. In addition, the GII takes into account the level of economic development of the country under study, according to which they are divided into four large subgroups. The Global Innovation Index (GII) is published by the World Intellectual Property Organization, a specialized agency of the United Nations [9,14]. Innovation in such conditions is defined as a key factor of the economic development and growth, contributing to the achievement of sustainable development at the global level.

According to the GII indicator, Ukraine in 2021 ranked third among its group of countries, which were ranked by the level of economic income. The GII consists of eight sections: knowledge and technological results, human capital and research, creative results, global

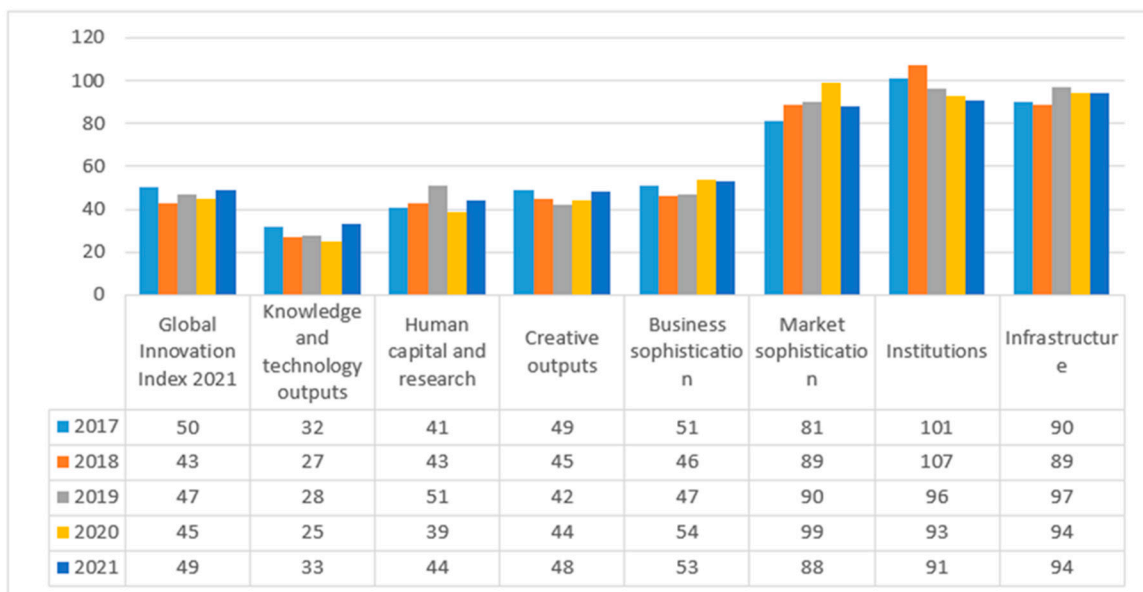
innovation index, business development, market development, institutional environment, and infrastructure. The place of Ukraine in the ranking is shown in Figure 1.



**Figure 1.** The seven GII pillar scores for Ukraine. **Source:** WIPO (2021). The Global Innovation Index 2021: Ukraine. Reprinted under the Creative Commons license, WIPO [9].

In 2021, the ranking score of Ukraine in the GII was 49 points. By its geographical location, the indicators are not big enough, but the trends in different indicators remain. However, according to the indicator “human capital and research”, Ukraine has a rather significant gap with European countries, which negatively affects the formation of an innovative environment, provision of processes of intellectualization of the Ukrainian human capital.

However, in order to objectively assess the innovation potential of the Ukrainian economic environment and the ability to intellectualize human capital, it is reasonable to analyze the rating indicators and elements of GII for the last five years (Figure 2).



**Figure 2.** Dynamics of Ukraine in the Global Innovation Index (GII) by components 2017–2021. [14,55].



According to Figure 2, the main problem indicators of innovative development of Ukraine according to GII are market development, institutional environment, and infrastructure. That is, the problems regard intellectualization of human capital in conditions of innovative transformations for Ukraine sociopolitical and market mechanisms, which essentially influence the processes of intellectualization of human capital on enterprises. That is why it is advisable to study the impact of such factors on the intellectualization of human capital by using the tools of factor analysis. At the same time, it is human capital and research that have a fairly strong potential for development, because the “knowledge and technology” indicators in the GII rating are the highest and range in value from 25 to 33, which is high, especially in the group of countries for economic development, to which Ukraine was attributed. It should also be noted that some of the problem indicators, such as “institutional environment” for the period under review demonstrate positive dynamics. We believe that one of the reasons for such positive (but slow) shifts is the increased implementation of digital technologies at the state level.

## 6. Materials and Methods

Because the intellectualization of human capital is a complex process, one of the main stages in substantiating its strategic guidelines is the application of factor analysis methods. Intellectualization of human capital is a subjective phenomenon in its essence, so we consider it advisable to begin such factor analysis with the application of methods of expert evaluations. The use of the method of factor analysis [56] requires the identification of the main groups (directions) of factors affecting the processes of the intellectualization of human capital: sociopolitical and economic/financial. It is by grouping the factors into two subgroups that their impact on the intellectualization of human capital in an enterprise in the context of achieving the financial and economic sustainability of the enterprise will be taken into account.

Sociopolitical factors (S) reflect the general trends and attitudes in society, wherein the formation and development of human capital takes place. As a rule, the individual economic entity individual cannot influence in any way the factors of this nature, but their consideration in the study of the intellectualization of human capital is mandatory [53]. Sociopolitical factors reflect societal changes in the external environment and political regulation of the processes of human capital formation. Among the sociopolitical factors evaluated by the experts were:

- i. changes in labor legislation ( $S_1$ );
- ii. rapid pace of digitalization ( $S_2$ );
- iii. closeness and complexity of high-tech industries ( $S_3$ );
- iv. problems of pensions and social security ( $S_4$ ); and
- v. general level of education of the industry (country, region) ( $S_5$ ).

Factors of economic and financial nature (E) affect the intellectualization of human capital regardless of the will of the management or the employee himself; they are characterized by the variability and unpredictability of the external environment of the functioning of the enterprise as an economic unit.

Economic/financial factors reflect the objective influence of the external environment on the formation, development and intellectualization of human capital. In the conditions of innovative transformations, the authors for the procedure of expert assessments of the factors' influence were chosen:

- i. level of taxation and financial burden of utility payments ( $E_1$ );
- ii. inflationary processes ( $E_2$ );
- iii. dynamism of monetary regulation ( $E_3$ );
- iv. financial and economic motivation of employees ( $E_4$ ); and
- v. investments into training, mastering of new competencies ( $E_5$ ).

At the same time, the sociopolitical and economic/financial factors suggested reflect the characteristic features of achieving economic sustainability by economic agents, because

the processes of intellectualization of human capital contribute to the efficient use of resources.

In the future, in the realities of the world economy, the factors of financial and economic development of the intellectualization of human capital will be the creation of favorable financial conditions for the industries that are most intellectually saturated and ensuring state participation in the processes of infrastructure reform, which will promote the institutional environment for the intellectualization of human capital.

The specifics of research on human capital information and its intellectualization, including at the enterprise level, is a rather subjective process, as it is difficult to measure the quantitative capacity of a particular individual to intellectualize (including at the enterprise level). Consequently, we believe that this situation necessitates the use of an expert evaluation method. To study the influence of sociopolitical and economic/financial factors on the processes of intellectualization of human capital, the methods of expert estimation were used because it is this method that allows the subjective aspects of the processes of intellectualization of human capital on enterprises to be taken into account. The use of a methodology that involves experts provides a common methodological basis from which conclusions can be drawn and measures can be proposed to improve the object of the study in a higher-level system.

The authors conducted a survey among economists by completing the prepared questionnaires. With regard to the sample of experts, letters of invitation were sent to Ukrainian scientists who, according to their publications, deal with the development of human capital at the micro-level and its impact on the activities of industrial enterprises. A total of over 20 scientific experts were interviewed.

The procedure of expert evaluations envisaged the experts' evaluation of the suggested directions by individual factors (the total of which was 10). The experts were offered to estimate the influence of a specific factor on the intellectualization of human capital from 1 to 5, where 0 degrees of influence of factor N was the lowest and 5 degrees of influence of factor N was the highest. That is, the maximum current score from one expert was 50.

First of all, using the method of expert evaluations in factor analysis involves calculating the percentage of expert evaluations according to the formula

$$Pxi = \frac{\sum_{q=1}^n dq}{\sum_{q=1}^n \max dq} = \frac{\sum_{q=1}^n dq}{50}, \quad (1)$$

where,  $Pxi$  is the percentage of evaluations of the index  $x_i$ ,  $d_q$  is the evaluation of the  $q$ -th index by  $q$ -th expert,  $q$  is the total number of experts, and  $\max d_q$  is the maximum possible value of the index  $d_q$  in the scale.

Then, we determine the weight of each of the factors of intellectualization of human capital on enterprises in accordance with a certain strategic direction, which is calculated as the ratio of the value of each threat to the sum of all values Equaton (2),

$$Tx_i = \frac{Px_i}{\sum_{i=1}^k Px_i}, \quad (2)$$

where  $x_i$  is the weight of each of  $x_i$  factors of intellectualization of human capital on enterprises and  $k$  is the total number of evaluated factors.

According to the calculated indicators of the values of each factor of intellectualization of human capital on enterprises, we can build models of the influence of the factors on each individual strategic direction of influence on the intellectualization of human capital,

$$FN = \sum \frac{(X_1; X_2; X_3 \dots X_n)}{k}, \quad (3)$$

where  $FN$  represents the factors of the  $N$ -th separate direction of influence on the intellectualization of human capital,  $X_n$  is the weight of the influence of the  $n$ -th factor, and  $k$  is the number of factors taken into account in the  $n$ -th direction of influence.

The calculation of the main indicators is performed in accordance with the method of expert assessments.

Calculations of the main indicators of sociopolitical (S) factors of influence on the intellectualization of human capital on enterprises can be carried out according to the formulas.

The weight of each of the factors of intellectualization of human capital on enterprises according to a particular strategic direction, which is calculated as the ratio of the value of each threat to the sum of all values,

$$Ts_i = \frac{Ps_i}{\sum_{i=1}^k Ps_i}, \quad (4)$$

where  $Ps_i$  is the % of assessments of the indicator  $S_i$ ,  $S_i$  is the weight of each of the sociopolitical ( $S_i$ ) factors of intellectualization of human capital on enterprises, and  $k$  is the total number of assessed sociopolitical factors.

In accordance with the calculated indicators of the values of each factor of the intellectualization of human capital, we can build a model of the influence of sociopolitical factors on the intellectualization of human capital on enterprises,

$$Fs = \sum \frac{(S_1; S_2; S_3 \dots S_n)}{k}, \quad (5)$$

where  $F_s$  represents the factors of the sociopolitical direction of influence on intellectualization of human capital,  $S_n$  is the weight of influence of the  $n$ -th factor, and  $k$  is the number of factors taken into account in sociopolitical direction of influence.

According to Equations (1)–(3) we can build a model of the influence of economic/financial factors on the intellectualization of human capital on enterprises,

$$FE = \sum \frac{(E_1; E_2; E_3 \dots E_n)}{k}, \quad (6)$$

where,  $FE$  represents the factors of economic/financial direction of influence on the intellectualization of human capital,  $E_n$  is the weight of influence of the  $n$ -th factor, and  $k$  is the number of considered factors in the economic/financial direction of influence.

## 7. Results

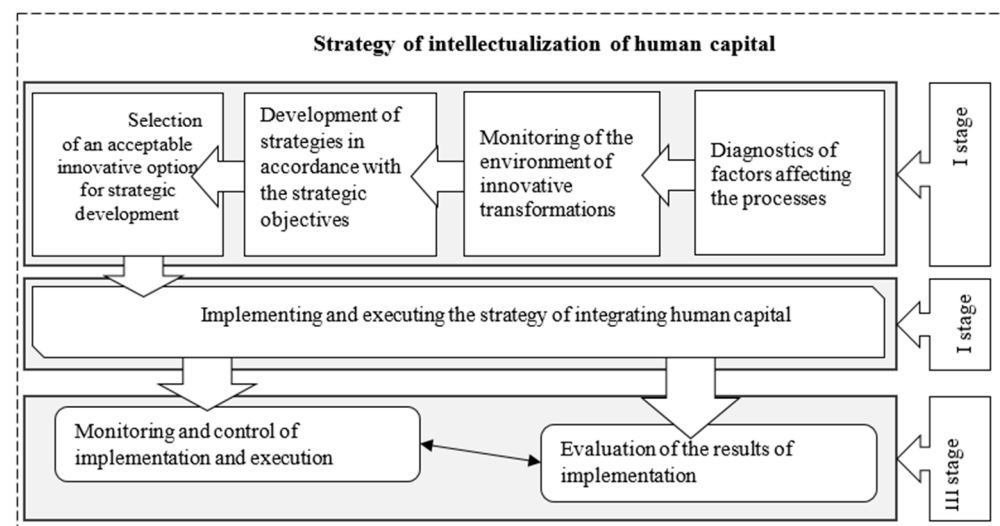
The combination of quantitative and qualitative characteristics of the objects of the research is not a negative component of factor analysis and application of methods of expert evaluations. The proposed models (Equations (5) and (6)) allow estimation of the degree of influence of the outlined groups of factors on the human capital intellectualization within the range from 0 to 1, where the most intensive influence is exerted by the factors, the model values of which are close to 1. The results of the calculations are shown in Table 1.

The results of the calculations on the percentage of the experts' evaluations in determining the significance of sociopolitical (S) and economic/financial (E) factors; the total sum of all evaluations, the weight of each of the economic/financial and sociopolitical factors and in accordance with the models of factors influence on each of the defined strategic directions (FS and FE) are shown in Table 1.

**Table 1.** Results of calculating the values of the influence of strategic groups of factors on the human capital intellectualization.

| Indicator  | Sociopolitical Factors | Economic/Financial Factors |
|--|------------------------|----------------------------|
| Percentage of experts ratings<br>( $Px_i$ )  | $S_1 = 0.40$           | $E_1 = 0.64$               |
|  | $S_2 = 0.62$           | $E_2 = 0.46$               |
|  | $S_3 = 0.54$           | $E_3 = 0.48$               |
|  | $S_4 = 0.60$           | $E_4 = 0.62$               |
|  | $S_5 = 0.66$           | $E_5 = 0.56$               |
| Total sum of evaluations   | 5.58                   |                            |
| Weight value of each factor of<br>economic-financial and<br>socio-political factors ( $Tx_i$ ) | $S_1 = 0.072$          | $E_1 = 0.115$              |
|  | $S_2 = 0.111$          | $E_2 = 0.082$              |
|  | $S_3 = 0.097$          | $E_3 = 0.086$              |
|  | $S_4 = 0.108$          | $E_4 = 0.111$              |
|  | $S_5 = 0.118$          | $E_5 = 0.100$              |
| Model of influence of factors<br>on each of the defined<br>strategic directions ( $F_N$ )      | $F_S = 0.564$          | $F_E = 0.552$              |

According to the results of the conducted research (Table 1, Figure 3) we see that the influence of certain strategic directions exceeds 0.5, but that those directions are very close to one another. Such dynamics indicate the significant influence of both groups and their equivalence in the processes of intellectualization of human capital on enterprises. Such results are of particular importance in the conditions of innovative transformations, because they confirm the hypothesis concerning the dependence of the development of intellectualization of innovation on the sociopolitical and economic financial factors in the strategic dimension.

**Figure 3.** A chart of formation of strategic directions of intellectualization of human capital for industrial enterprises.

Dynamism of the environment and the need to adapt to it prompts one to take into account the strategic aspect when activating the processes of intellectualization of human capital on enterprises. That is why the development of a general scheme of formation of strategic guidelines for the intellectualization of human capital is justified (Figure 3). The formation of the strategy of intellectualization of human capital on enterprises takes place in three stages. The first stage is preparatory and includes diagnosis of the factors influencing the processes of intellectualization of human capital, monitoring of the environment of innovative transformations, development of strategies in accordance with the strategic

objectives, and selection of an acceptable innovative option of the strategic development of the intellectualization of human capital. The second stage is a practical reflection of the processes of the first stage, as it involves the implementation and execution of the strategy of intellectualization of human capital. The third stage of the proposed scheme involves monitoring and control of the implementation and execution of strategies, as well as an evaluation of the results of the implementation of the implemented strategy of intellectualization of human capital.

The reasons studied are the prerequisites for the formation of strategic guidelines for the development of intellectualization of human capital on enterprises. Peculiarities of the formation of strategic potential of micro- and macroeconomic systems imply consideration under conditions of economic environment (both internal and external), such as creative, adaptive, innovative, or circular economy [10]. That is, the formation of strategic guidelines for the intellectualization of human capital is based on the identified results of factor analysis. However, in addition to the identified factors, it is advisable to take into account the conditions of innovative transformations, which are the sources of concretization of the factors. In the context of the general scheme of formation of strategic guidelines of intellectualization of human capital, it is necessary to provide the analysis of the environment of innovative transformations.

In addition, the results of the study can be attributed to the theoretical contributions made, which allowed us:

- to deepen the categorical basis of human capital research by providing the authors' definition of the concept of "intellectualization of human capital", which, unlike existing ones, allowed us to detail the understanding of the importance of human capital and innovation along with clarifying its place in economic theory;
- to improve the approach to calculating the impact of factors on human capital through the prism of its intellectualization; and
- to propose a general scheme of forming strategic guidelines for intellectualization of human capital for industrial enterprises.

## 8. Conclusions

Consequently, the conducted study allows us to draw theoretical and practical conclusions in accordance with the contribution to the subject of research. The theoretical contribution is based on the highlighting of the hypothesis concerning the authors' interpretation of the concept of "intellectualization of human capital", which allows us to form a theoretical basis for future studies of human capital development in the conditions of structural transformation of economic systems.

The practical significance of the study consists in proposing directions for the formation of strategic guidelines for the intellectualization of human capital of an enterprise. Thus, having carried out a complex study of features of formation of strategic orientations of intellectualization of human capital on enterprises, it is possible to propose changes of their key directions in accordance with the revealed influences of sociopolitical and economic/financial factors.

Consequently, for the sociopolitical direction it is advisable to implement measures to motivate elements of human capital in development through the use of innovation, the latest technologies, in particular, Industry 4.0. and intensification of cooperation with international organizations on this issue and to ensure the development of individual competencies, skills, and knowledge accumulation in the context of the collective human capital formation within one economic entity (enterprise, region, industry, cluster, country). According to the economic and financial direction, the following can be implemented: bringing products of intellectualization of human capital to international financial markets, which will attract international financial resources, enhance globalization processes, and create of favorable financial conditions and investment support of innovative transformations of industry, production, and transport.

In practice, the conducted study will allow enterprises (taking into account the results) to contribute to an increase in the level of human capital development, which may lead to an increase in the indicators of Ukraine in the Global Index of Innovation. For further research, an important direction is the development of human capital intellectualization at the corporate level, which includes cross-cultural management, opportunities for social harmonization, economic, innovative, and motivational interests in the spheres of economic environment. Development of effective general and local mechanisms for the formation of strategic guidelines should be based on sociopolitical and economic financial factors of the micro-level and their mutual penetration for the preparation of perspective competencies, which will contribute to global development. The main recommendations for further research are:

- supplementing and expanding the sociopolitical and financial/economic factors determining the formation of strategic guidelines for the development of human capital of enterprises, taking into account changes in the external environment of business entities' activities;
- updating the study by taking into account the trends in the Global Innovation Index, respective to the national research environment; and
- approbation of the general scheme of forming strategic guidelines for the intellectualization of human capital for industrial enterprises and the study of the problems arising from this experiment.

We believe that the methodology of expert assessments used to identify the impact of factors on the intellectualization of human capital of enterprises provides significant limitations to the study, as it reflects the subjective perception of the problem studied by individual experts. These limitations can be overcome by using a different methodology of factor analysis and comparison with the methodology used in this article. In addition, the limitations of this study are the proposed sample of sociopolitical and financial/economic factors, which future researchers can expand according to the changes that will occur.

Thus, the problems described in the study indicate the intensification of processes of intellectualization of human capital at the enterprise level and the influence of certain factors. At the same time, the prospects of future research on the intellectualization of human capital require limiting the objects of research to economic units that carry out their activities in one national economic environment, taking into account the influence of global factors. Such limitations will allow specifying the proposed theory of formation of strategic guidelines for intellectualization of human capital in other national (not Ukrainian) realities of the economic environment.

**Author Contributions:** Conceptualization, A.K. (Aleksandra Kuzior), O.A., A.K. (Alona Kovalchuk), P.B. and V.T.; methodology, A.K. (Aleksandra Kuzior), O.A., A.K. (Alona Kovalchuk), P.B. and V.T.; validation, A.K. (Aleksandra Kuzior), O.A. and V.T.; formal analysis, A.K. (Aleksandra Kuzior), O.A., A.K. (Alona Kovalchuk), P.B. and V.T.; resources, A.K. (Aleksandra Kuzior), O.A., A.K. (Alona Kovalchuk), P.B. and V.T.; data curation, A.K. (Aleksandra Kuzior), O.A., A.K. (Alona Kovalchuk), P.B. and V.T.; writing—review and editing, A.K. (Aleksandra Kuzior), O.A., A.K. P.B. and V.T.; visualization, A.K. (Aleksandra Kuzior), O.A., A.K. (Alona Kovalchuk), P.B. and V.T.; supervision, A.K. (Aleksandra Kuzior), O.A. and V.T.; project administration, A.K. (Aleksandra Kuzior); funding acquisition, A.K. (Aleksandra Kuzior). All authors have read and agreed to the published version of the manuscript.

**Funding:** The research received funding under the research subsidy of the Faculty of Organization and Management of the Silesian University of Technology for the year 2022 (13/990/BK\_22/0170).

**Institutional Review Board Statement:** Not applicable.

**Informed Consent Statement:** Not applicable.

**Data Availability Statement:** Not applicable.

**Conflicts of Interest:** The authors declare no conflict of interest.

## References

1. Becker, G.S. Human capital. *Concise Encycl. Econ.* **2002**, *2*, 1–12.
2. Kochmańska, A. Działalność innowacyjna w przedsiębiorstwie z branży usługowej—Podsumowanie wyników badań. *Syst. Wspomagania Inżynierii Prod.* **2014**, *1*, 101–111.
3. Kuzior, A.; Kettler, K.; Rąb, Ł. Digitalization of Work and Human Resources Processes as a Way to Create a Sustainable and Ethical Organization. *Energies* **2021**, *15*, 172. [[CrossRef](#)]
4. Poberezhna, Z. Comprehensive Approach to the Efficiency Assessment of the Business Model of the Aviation Enterprise Based on Business Process Innovation. *East.-Eur. J. Enterp. Technol.* **2021**, *5*, 113. [[CrossRef](#)]
5. Marimuthu, M.; Arokiasamy, L.; Ismail, M. Human capital development and its impact on firm performance: Evidence from developmental economics. *J. Int. Soc. Res.* **2009**, *2*, 265–272.
6. Pennings, J.M.; Lee, K.; Witteloostuijn, A.V. Human capital, social capital, and firm dissolution. *Acad. Manag. J.* **1998**, *41*, 425–440. [[CrossRef](#)]
7. Wei, G.; Gao, H.; Wang, J.; Huang, Y. Research on risk evaluation of enterprise human capital investment with interval-valued bipolar 2-tuple linguistic information. *IEEE Access* **2018**, *6*, 35697–35712. [[CrossRef](#)]
8. Vo, D.H.; Tran, N.P. Measuring national intellectual capital and its effect on country's competitiveness. *Compet. Rev.* **2022**. *ahead of print*. [[CrossRef](#)]
9. WIPO. The Global Innovation Index 2021: Ukraine. Available online: [https://www.wipo.int/edocs/pubdocs/en/wipo\\_pub\\_gii\\_2021/ua.pdf](https://www.wipo.int/edocs/pubdocs/en/wipo_pub_gii_2021/ua.pdf) (accessed on 24 March 2022).
10. Sawe, F.B.; Kumar, A.; Garza-Reyes, J.A.; Agrawal, R. Assessing people-driven factors for circular economy practices in small and medium-sized enterprise supply chains: Business strategies and environmental perspectives. *Bus. Strategy Environ.* **2021**, *30*, 2951–2965. [[CrossRef](#)]
11. Ober, J.; Kochmańska, A. Adaptation of Innovations in the IT Industry in Poland: The Impact of Selected Internal Communication Factors. *Sustainability* **2022**, *14*, 140. [[CrossRef](#)]
12. Tulchynska, S.; Popelo, O.L.H.A.; Vovk, O.; Dergaliuk, B.; Kreidych, I.; Tkachenko, T. The resource supply of innovation and investment strategies of the microeconomic systems modernization in the conditions of digitalization. *Trans. Environ. Dev.* **2021**, *17*, 819–828. [[CrossRef](#)]
13. Cammeraat, E.; Samek, L.; Squicciarini, M. *The Role of Innovation and Human Capital for the Productivity of Industries*; OECD Publishing: Paris, France, 2021; Volume 103.
14. Dutta, S.; Lanvin, B.; León, L.R.; Wunsch-Vincent, S. (Eds.) *Global Innovation Index 2021: Tracking Innovation through the COVID-19 Crisis*; World Intellectual Property Organization: Geneva, Switzerland, 2021. Available online: [https://www.wipo.int/edocs/pubdocs/en/wipo\\_pub\\_gii\\_2021.pdf](https://www.wipo.int/edocs/pubdocs/en/wipo_pub_gii_2021.pdf) (accessed on 24 March 2022).
15. Goldin, C. Human Capital. In *Handbook of Cliometrics*; Diebolt, C., Hauptert, M., Eds.; Springer: Berlin/Heidelberg, Germany, 2016; pp. 55–86.
16. Deming, D.J. Four Facts about Human Capital. *J. Econ. Perspect.* **2022**, *36*, 75–102. [[CrossRef](#)]
17. Prukinska, E.V.; Pereverzeva, A.V. The origin, essence and development of human capital in the conditions of modern market transformations. *Actual Probl. Econ.* **2008**, *1*, 196–202.
18. Kharazishvili, Y.; Kwilinski, A.; Dzwigol, H.; Liashenko, V. Strategic European Integration Scenarios of Ukrainian and Polish Research, Education and Innovation Spaces. *Virtual Econ.* **2021**, *4*, 7–40. [[CrossRef](#)]
19. Kuzior, A. Polish and German Experiences in Planning and Implementation of Sustainable Development. *Probl. Ekorozw.–Probl. Sustain. Dev.* **2010**, *5*, 81–89.
20. Arefieva, O.; Polous, O.; Arefiev, S.; Tytykalo, V.; Kwilinski, A. Managing sustainable development by human capital reproduction in the system of company's organizational behavior. In *IOP Conference Series: Earth and Environmental Science*; IOP Publishing: Bristol, UK, 2021; Volume 628, p. 012039.
21. Sardak, S.; Korneyev, M.; Simakhova, A.; Bilska, O. Global factors which influence the directions of social development. *Probl. Perspect. Manag.* **2017**, *15*, 323–333. [[CrossRef](#)]
22. Kuzior, A. Innovation management as a tool for sustainable development and improving the quality of life of societies. In *Innovation Management and Sustainable Economic Development in the Era of Global Pandemic*; Soliman, K.S., Ed.; International Business Information Management Association: Cordoba, Spain, 2021; pp. 211–216.
23. Grebski, M. Mobility of the Workforce and Its Influence on Innovativeness (Comparative Analysis of the United States and Poland). *Prod. Eng. Arch.* **2021**, *27*, 272–276. [[CrossRef](#)]
24. Grebski, M.E. *Comparative Analysis of Innovativeness Network in Poland and the United States (Monograph)*; Wydawnictwo Tnoik: Torun, Poland, 2021.
25. Kuzior, A.; Zozulak, J. Adaptation of the Idea of Phronesis in Contemporary Approach to Innovation. *Manag. Syst. Prod. Eng.* **2019**, *27*, 84–87. [[CrossRef](#)]
26. Ober, J. *Adaptacja Innowacji w Świetle Zachowań Organizacyjnych. Wybrane Aspekty*; Wydawnictwo Politechniki Śląskiej: Gliwice, Poland, 2022.
27. Lyulyov, O.; Pimonenko, T. (Eds.) Innovation, Social and Economic Challenges. In Proceedings of the International Scientific Online Conference, Sumy, Ukraine, 1–3 December 2020; Sumy State University: Sumy, Ukraine, 2020.

28. Vasylieva, T.A.; Kasyanenko, V.O. Integral assessment of innovation potential of Ukraine's national economy: A scientific methodical approach and practical calculations. *Актуальні Проблеми Економіки* **2013**, *144*, 50–59.
29. Chapman, B.J.; Pope, D. Government, human capital formation and higher education. *Aust. Q.* **1992**, *64*, 275–292. [[CrossRef](#)]
30. Tanzharikova, A.Z. The role of higher education system in human capital formation. *World Appl. Sci. J.* **2012**, *18*, 135–139. [[CrossRef](#)]
31. Dovgyi, S.; Nebrat, V.; Svyrydenko, D.; Babiichuk, S. Science education in the age of industry 4.0: Challenges to economic development and human capital growth in Ukraine. *Sci. Bull. Natl. Min. Univ.* **2020**, *1*, 146–151. [[CrossRef](#)]
32. Pylypenko, Y.; Pylypenko, H.; Prokhorova, V.V.; Mnykh, O.B.; Dubiei, Y.V. Transition to a new paradigm of human capital development in the dynamic environment of the knowledge economy. *Sci. Bull. Natl. Min. Univ.* **2021**, *6*, 170–176. [[CrossRef](#)]
33. Vătămănescu, E.M.; Gorgos, E.A.; Ghigiu, A.M.; Pătruț, M. Bridging intellectual capital and SMEs internationalization through the lens of sustainable competitive advantage: A systematic literature. *Sustainability* **2019**, *11*, 2510. [[CrossRef](#)]
34. Di Fabio, A.; Peiró, J.M. Human Capital Sustainability Leadership to promote sustainable development and healthy organizations: A new scale. *Sustainability* **2018**, *10*, 2413. [[CrossRef](#)]
35. Iarmosh, O.; Prokhorova, V.; Shcherbyna, I.; Kashaba, O.; Slastianyukova, K. Innovativeness of the creative economy as a component of the Ukrainian and the world sustainable development strategy. In *IOP Conference Series: Earth and Environmental Science*; IOP Publishing: Bristol, UK, 2021; Volume 628, p. 012035.
36. Kuznetsova, N.; Tkachuk, V.; Obikhod, S.; Vlasenko, T.; Samborska, O.; Chorna, L. Development and preservation of human capital under the conditions of the creative economy. *J. Manag. Inf. Decis. Sci.* **2021**, *24*, 1–8. [[CrossRef](#)]
37. Smerichevskiy, S.F.; Kryvovyazyuk, I.V.; Prokhorova, V.V.; Usarek, W.; Ivashchenko, A.I. Expediency of symptomatic diagnostics application of enterprise export-import activity in the disruption conditions of world economy sustainable development. In *IOP Conference Series: Earth and Environmental Science*; IOP Publishing: Bristol, UK, 2021; Volume 628, p. 012040.
38. Absalyamova, S.; Absalyamov, T.; Khusnullova, A.; Mukhametgalieva, C. The impact of corruption on the sustainable development of human capital. *J. Phys. Conf. Ser.* **2016**, *738*, 012009. [[CrossRef](#)]
39. Kucharčíková, A.; Mičiak, M. Human capital management in transport enterprises with the acceptance of sustainable development in the Slovak Republic. *Sustainability* **2018**, *10*, 2530. [[CrossRef](#)]
40. Pasban, M.; Nojehdeh, S.H. A Review of the Role of Human Capital in the Organization. *Procedia-Soc. Behav. Sci.* **2016**, *230*, 249–253. [[CrossRef](#)]
41. Caloghirou, Y.; Giotopoulos, I.; Kontolaimou, A.; Tsakanikas, A. Inside the black box of high-growth firms in a crisis-hit economy: Corporate strategy, employee human capital and R & D capabilities. *Int. Entrep. Manag. J.* **2020**, *18*, 1319–1345. [[CrossRef](#)]
42. Maslak, O.I.; Maslak, M.V.; Grishko, N.Y.; Yaroslava, Y.Y.; Hlazunova, O.O.; Pirogov, D.L. Innovative Safety of the Ukrainian Electrical Industry: Benchmarking Indicators for Provision. In Proceedings of the 2021 IEEE International Conference on Modern Electrical and Energy Systems (MEES), Kremenchuk, Ukraine, 21–24 September 2021; pp. 1–5.
43. Lepeyko, T.; Chernoiivanova, A. Specifics of organizing and standardizing innovative labour in information economy. In Proceedings of the 2015 Information Technologies in Innovation Business Conference (ITIB), Kharkiv, Ukraine, 7–9 October 2015; pp. 76–80.
44. Lenihan, H.; McGuirk, H.; Murphy, K.R. Driving innovation: Public policy and human capital. *Res. Policy* **2019**, *48*, 103791. [[CrossRef](#)]
45. Klimontowicz, M.; Majewska, J. The contribution of intellectual capital to banks' competitive and financial performance: The evidence from Poland. *J. Entrep. Manag. Innov.* **2022**, *18*, 105–136. [[CrossRef](#)]
46. Puzynya, T.A.; Avilova, N.L.; Dyshlovoi, I.N.; Nikolskaya, E.Y.; Solntseva, O.G. Intellectual capital as a factor of increasing companies' competitiveness. *Rev. Line Política Gestão Educ.* **2022**, *26*, e022057. [[CrossRef](#)]
47. Pirogova, O.; Plotnikov, V.; Yusufova, A. An Approach to Assessing Construction Enterprise Intellectual Capital in the Digital Age. In *Technological Advancements in Construction*; Springer: Cham, Switzerland, 2022; pp. 381–390.
48. Ahmad, M.; Wu, Q.; Khattak, M.S. Intellectual capital, corporate social responsibility and sustainable competitive performance of small and medium-sized enterprises: Mediating effects of organizational innovation. *Kybernetes* **2022**. ahead of print. [[CrossRef](#)]
49. Dzenopoljac, V.; Kwiatek, P.; Dzenopoljac, A.; Bontis, N. Intellectual capital as a longitudinal predictor of company performance in a developing economy. *Knowl. Process Manag.* **2022**, *29*, 53–69. [[CrossRef](#)]
50. Bordbar, G.; Monfared, A.K.; Sabokro, M.; Dehghani, N.; Hosseini, E. Human resources competencies scale development and validation: An Iranian measure. *Ind. Commer. Train.* **2021**, *53*, 250–267. [[CrossRef](#)]
51. Vasylieva, O.I.; Rybka, A.O. Analysis of modern problems of formation and development of human capital in Ukraine. *Invest. Pract. Exp.* **2021**, *4*, 93–97. [[CrossRef](#)]
52. Mohiuddin, M.; Hosseini, E.; Faradonbeh, S.B.; Sabokro, M. Achieving Human Resource Management Sustainability in Universities. *Int. J. Environ. Res. Public Health* **2022**, *19*, 928. [[CrossRef](#)]
53. Sarwar, A.; Khan, M.A.; Sarwar, Z.; Khan, W. Financial development, human capital and its impact on economic growth of emerging countries. *Asian J. Econ. Bank.* **2021**, *5*, 86–100. [[CrossRef](#)]
54. Hilorme, T.; Perevozova, I.; Shpak, L.; Mokhnenko, A.; Korovchuk, Y. Human capital cost accounting in the company management system. *Acad. Account. Financ. Stud. J.* **2019**, *23*, 1–6.



- 
55. Dutta, S.; Lanvin, B.; Wunsch-Vincent, S. (Eds.) Global Innovation Index 2020; Cornell University, INSEAD, and WIPO Ithaca, Fontainebleau and Geneva, Switzerland. 2020. Available online: [https://www.wipo.int/edocs/pubdocs/en/wipo\\_pub\\_gii\\_2020.pdf](https://www.wipo.int/edocs/pubdocs/en/wipo_pub_gii_2020.pdf) (accessed on 24 March 2022).
  56. Geweke, J.F.; Singleton, K.J. Maximum likelihood “confirmatory” factor analysis of economic time series. *Int. Econ. Rev.* **1981**, *22*, 37–54. [[CrossRef](#)]